WHAT IS CLAIMED IS:

1.   1.   A processor comprising:

2.   an out-of-order microinstruction pointer (µIP) stack in a

3.   microcode (µcode) execution core.

1.   2.   The processor of claim 1 in which the µIP stack

2.   comprises:

3.   an entry number field;

4.   a microinstruction pointer (µIP) field;

5.   a back pointer field;

6.   a retirement indicator field; and

7.   a return pointer field.

1.   3.   The processor of claim 2 in which the µIP field is

2.   14-bits wide.

1.   4.   The processor of claim 3 in which the µIP field has

2.   a microinstruction pointer (µIP) pushed by a first

3.   microoperation (µOp) code and used by a second µOp code.

1.   5.   The processor of claim 2 in which the back pointer

2.   field has a pointer to a next entry in the µIP stack for a

3.   micro-type of service (µTOS) bit to point to after a µOp.

1   6.   The processor of claim 2 in which the retirement

2   indicator field has an indication of whether an entry has

3   retired.

1   7.   The processor of claim 2 in the return pointer field

2   a pointer to a location in a retirement stack to which an

3   entry is copied after being retired.

1   8.   A method executed in a processor comprising:

2   executing microcode (μcode) stored in an out-of-

3   order microinstruction pointer (μIP) stack; and

4   manipulating the μIP stack with a set of

5   microinstructions.

1   9.   The method of claim 8 in which the stack has an

2   entry number field, a microinstruction pointer (μIP) field, a

3   back pointer field, a retirement indicator field and a return

4   pointer field.

1   10. The method of claim 9 in which the μIP pointer field

2   is 14-bits wide.

1   11. The method of claim 10 in which the μIP pointer

2   field has a microinstruction pointer (μIP) pushed by a first

3   microoperation (μOp) code and used by a second μOp code.

1   12. The method of claim 9 in which the back pointer

2   field has a pointer to a next entry in the µIP stack for a

3   micro-type of service (µTOS) bit to point to after a µOp.

1   13. The method of claim 9 in which the retirement

2   indicator field has an indication of whether an entry has

3   retired.

1   14. The method of claim 9 in which the return pointer

2   field contains a pointer to a location in a retirement stack

3   to which an entry is copied after being retired.

1   15. The method of claim 9 in which manipulating

2   comprises:

3   pushing a next µIP on to the µIP stack; and

4   using the next µIP in an intermediate field as a target

5   µIP in a jump operation.

1   16. The method of claim 9 in which manipulating

2   comprises:

3   taking a value of an intermediate field of a

4   microoperation (µOp); and

5   pushing the value on to the µIP stack.

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1   17.   The method of claim 9 in which manipulating

2   comprises:

3   popping a value off the µIP stack; and

4   replacing a current µOp intermediate field.

1   18.   The method of claim 9 in which manipulating

2   comprises:

3   popping a value off of the µIP stack; and

4   jumping to that value.

1   19.   The method of claim 9 in which manipulating

2   comprises:

3   reading a value off the µIP stack; and

4   replacing a µOp's intermediate field with the value.

1   20.   The method of claim 9 in which manipulating

2   comprises setting the µIP stack pointers to reset.

1   21.   The method of claim 9 further comprising providing a

2   set of pointers that point to different entries in the µIP

3   stack.

1   22.   The method of claim 21 in which the set of pointers

2   includes a µTOS pointer that points to a top of the µIP stack.

23. The method of claim 21 in which the set of pointers includes a µAlloc pointer that points to a next allocated entry in the µIP stack.

24. The method of claim 21 in which the set of pointers includes a NextRet pointer that points to a next entry in the µIP stack to be deallocated.

25. The method of claim 21 in which the set of pointers includes µRetTos pointer that points at a retired top of the µIP stack.

26. The method of claim 8 in which the µOPs include an ms_call µOP that takes a next µIP, pushes the next µIP on the µIP stack, and uses the next µIP in an intermediate field as a target µIP of a jump.

27. The method of claim 8 in which the µOPs include an ms_push µOP that takes a value in an intermediate field and pushes the value on the µIP stack.

28. The method of claim 8 in which the µOPs include an ms_pop µOP that pops a value off the µIP stack and replaces the value with the µOP's intermediate field.

29. The method of claim 8 in which the μOPs include an ms_return μOP that pops a value off of the μIP stack and jumps to that μIP.

30. The method of claim 8 in which the μOPs include an ms_tos_read μOP that reads a value off the μIP stack and replaces this μOP's intermediate field.

31. The method of claim 8 in which the μOPs include an ms_μip_stack_clear μOP that sets the μIP stack pointers to reset.

32. A computer program product residing on a computer readable medium having instructions stored thereon which, when executed by the processor, cause the processor to:

execute microcode (μcode) stored in an out-of-order microinstruction pointer (μIP) stack; and

manipulate the μIP stack with a set of microinstructions.

33. The computer program product of claim 32 wherein instructions to manipulate further comprise instructions to:

push a next μIP on to the μIP stack; and

use the next μIP in an intermediate field as a target μIP in a jump operation.

1   34. The computer program product of claim 32 wherein

2 instructions to manipulate further comprise instructions to:

3   take a value of an intermediate field of a microoperation

4 (μOp); and

     push the value on to the μIP stack.

1   35. The computer program product of claim 32 wherein

2 instructions to manipulate further comprise instructions to:

3   pop a value off the μIP stack; and

4   replace a current μOp intermediate field with the value.

1   36. The computer program product of claim 32 wherein

2 instructions to manipulate further comprise instructions to:

3   pop a value off of the μIP stack; and

4   jump to that value.

1   37. The computer program product of claim 32 wherein

2 instructions to manipulate further comprise instructions to:

3   read a value off the μIP stack; and

4   replace a μOp's intermediate field with the value.

1   38. The computer program product of claim 32 wherein

2 instructions to manipulate further comprise instructions to:

3   set the μIP stack pointers to reset.